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| 09/805,216 | 03/14/2001 | Shinya Kobayashi | HO4-3303/HO | 8566 |

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WHITHAM, CURTIS & CHRISTOFFERSON, P.C.
11491 SUNSET HILLS ROAD
SUITE 340
RESTON, VA 20190

EXAMINER

NGUYEN, LAM S

| ART UNIT | PAPER NUMBER |
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2853

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/805,216

Applicant(s)

KOBAYASHI ET AL.

Examiner

LAM S NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,3,8,9 and 12 is/are rejected.
- 7) ☒ Claim(s) 4-7,10,11,13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

The indicated allowability of claims 2-11 is withdrawn in view of the newly discovered reference(s) to Akahira (JP02001228320A). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 2, 3, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (US 6046822) in view of Akahira (JP02001228320A)*.

** Because the patent US 6471352 to Akahira is an equivalent document to the patent JP02001228320A, the patent US 6471352 is used in the following rejection as an English translation document of the patent JP02001228320A.*

Wen et al. discloses an image forming device comprising:

a head formed with a plurality of nozzles (FIG. 1a, element 47);

a converting unit (in term of “calibrator”) that converts recording data (in term of “the pixel values”) into driving data (in term of “waveform index numbers”), the driving data including data sets defining driving pulses for corresponding ones of the plurality of nozzles (column 1, line 66 to column 2, line 3);

a feed unit that feeds a recording medium in a first direction (FIG. 5: a feeder feeds the printing medium (element 120));

an ejection element (FIG. 1b, element 260) provided to each one of the plurality of nozzles (FIG. 1b, element 45) for ejecting an ink droplet (FIG. 1b, element 1b) from the corresponding nozzle onto the recording medium in response to the driving data while the feed unit is feeding the recording medium in the first direction; and

a memory that stores nozzle profile data (in term of “a droplet placement characteristic”) (column 1, line 50-53: teaching a nozzle has a droplet placement characteristic associate therewith. Thus, there must be a memory to store this characteristic data such as Look-Up-Table introduced in column 2, line 40-45)) including waveform data and timing data for each of the plurality of nozzles, the waveform data and the timing data (column 2, line 13-15) indicating a waveform and a generating timing, respectively, of the driving pulse for each one of the plurality of nozzles (column 1, line 50-57), wherein the converting unit converts the recording data into the driving data based on the nozzle profile data, and each of the driving pulses is defined by a plurality of data sets of the driving data (column 1, line 66 to column 2, line 3).

Wen et al. do not disclose the comprising of a designating unit that designates a target ink amount of the ink droplet and a target impact position on the recording medium on which the ink droplet impacts, a measuring unit that measures a distance between the target impact position and an actual impact position on the recording medium where the ink droplet has impacted with respect to the first direction, and an updating unit that updates the nozzle profile data based on the target impact position and the distance measured by the measuring unit (**Referring to claim 3**), or an updating unit that updates the waveform data for each of the plurality of nozzles when a printing condition has been changed (**Referring to claim 2**), or a leveling unit that levels

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generating timings of the driving pulses by changing the timing data of the nozzle profile data **(Referring to claim 12).**

However, Akahira discloses a printing apparatus comprising of a designating unit that designates a target ink amount of the ink droplet and a target impact position on the recording medium on which the ink droplet impacts, a measuring unit that measures a distance between the target impact position and an actual impact position on the recording medium where the ink droplet has impacted with respect to the first direction (FIG. 13: a corresponding measuring unit that measures a distance between the target impact position and an actual impact position in steps S2-S4), and an updating unit that updates the nozzle profile data based on the target impact position and the distance measured by the measuring unit (FIG. 13: a corresponding updating unit that updates the nozzle profile data by changing the ejection timing in step S5), or an updating unit that updates the waveform data for each of the plurality of nozzles when a printing condition has been changed (FIG. 13: a corresponding updating unit that updates the nozzle profile data by changing the ejection timing when the printing condition such as the difference from the target position and the landing position in step S5), or a leveling unit that levels generating timings of the driving pulses by changing the timing data of the nozzle profile data (FIG. 13: a corresponding leveling unit that levels generating timings of the driving pulses by changing the ejection timing in step S5).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to include a measuring unit for measuring a distance between the target impact position and an actual impact position, an updating unit or a leveling unit for updating or changing the ejection timing based on the difference of the positions as disclosed by Akahira into

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the printing apparatus disclosed by Wen et al. The motivation of doing so is to adjust the landing positions of ink drops so that the ejected ink may land to the target location in order to gain printing quality as taught by Akahira (column 17, line 38-45).

2. Claim 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (US 6046822) in view of Akahira (JP02001228320A)* as applied to claim 3 above, and further in view of Sachs et al. (US 5807437).

Wen et al. disclose the claimed invention as discussed above and Akahira further disclose the comprising designating unit that designates a target ink amount of the ink droplet and a target impact position on the recording medium on which the ink droplet impacts with respect to the first direction and the second direction, a first/second measuring unit that measures a first/second distance between the target impact position and an actual impact position on the recording medium where the ink droplet has impacted with respect to the first/second direction, and an updating unit that updates the nozzle profile data based on the target impact position, the first and second distances (FIG. 13) (**Referring to claim 9**). However, Wen et al., as modified, do not disclose wherein the comprising of a deflection electric field generating unit and a charging electric field generating unit, the deflection electric field generating a deflection electric field in a space defined between the recording medium and the head, the deflection electric field having a field element in a second direction substantially perpendicular to the first direction and a third direction in which the ink droplet is ejected, the charging electric field generating unit generating a charging electric field in the plurality of nozzles, the charging electric field having a field element in the third direction.

Sachs et al. disclose a printing system comprising of a deflection electric field generating unit (FIG. 4, element 25) and a charging electric field generating unit (FIG. 4, element 23), the deflection electric field generating a deflection electric field in a space defined between the recording medium (FIG. 4, element 30) and the head (FIG. 4, element 19), the deflection electric field having a field element in a second direction substantially perpendicular to the first direction and a third direction in which the ink droplet is ejected, the charging electric field generating unit generating a charging electric field in the plurality of nozzles (FIG. 4, element 22), the charging electric field having a field element in the third direction.

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to include the deflection electric field generating unit and the charging electric field generating unit for generating a deflection electric field in a second direction and a charging electric field in the plurality of nozzles in the third direction as disclosed by Sachs et al. into the printing system disclosed by Wen et al., as modified. The motivation of doing so is to achieve a precise drop placement with high deposition rates utilizing an array of binary continuous jets in a single printhead as taught by Sachs et al. (column 4, line 44-48).

Allowable Subject Matter

3. Claims 4-7, 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Referring to claim 4: The most pertinent art Wen et al. (US 6046822) and Akahira (JP02001228320A) fail to disclose wherein the updating unit includes a first unit and a second unit, the first unit updating the waveform data of the nozzle profile data so as to change the

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ejected ink amount of the ink droplet, the second unit updating the timing data of the nozzle profile data so as to control the actual impact position with respect to the first direction.

Therefore, the claimed invention is not disclosed by the cited prior arts.

Referring to claim 10: The most pertinent art Wen et al. (US 6046822) and Akahira (JP02001228320A) fail to disclose the process in which a third unit changes the timing data after the second unit has changed the waveform data which had been changed by the first unit so as to control the actual impact position with respect to the first direction for each of the plurality of nozzles. Therefore, the claimed invention is not disclosed by the cited prior arts.

Claims 5-7 and 11 are allowable because they depend directly/indirectly on claims 4 and 10.

3. Claims 13 and 14 are allowed.

Referring to claim 13: The most pertinent art Wen et al. (US 6046822) and Akahira (JP02001228320A) fail to disclose the comprising of a resolution changing unit that changes a time resolution, wherein each one of the plurality of data sets of the driving data having an original time resolution, and the resolution setting unit that sets the original time resolution of each of the data sets to a predetermined time resolution and wherein the original time resolution determines the waveform of each of the driving pulses, and the predetermined time resolution determines the generating timing of each of the driving pulses. Therefore, the claimed invention is not disclosed by the prior arts.

Claim 14 is allowed because it depends on claim 13.

Response to Arguments

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Applicant's arguments with respect to claim 12 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (703)305-3342.

The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, RUSS can be reached on (703)308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3431 for regular communications and (703)305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

LN

May 29, 2003


JUDY NGUYEN
PRIMARY EXAMINER